

Following XTE J1908+094 in X-rays and Radio towards quiescence



Peter Jonker, Elena Gallo, Vivek Dhawan, Michael Rupen, Rob Fender,
Guillaume Dubus

Background Info

Gallo et al. (2002, 2003) and Corbel et al. (2003) reported correlations between the X-ray and radio fluxes of the BHC SXTs GX 339-4 and V404 Cyg (e.g. see Figure 1 below).

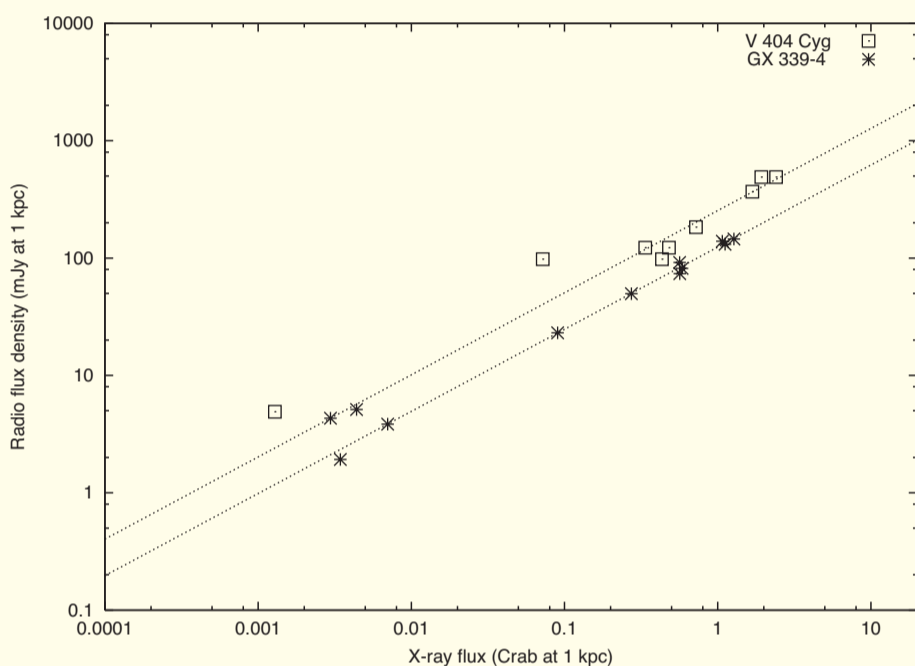


Fig. 1: Correlation between the X-ray and Radio flux in V404 Cyg and GX 339-4 (from Gallo et al. 2002)

In the present work we followed in X-rays and radio the BHC SXT XTE J1908+094 during its decay towards quiescence. The goal is to establish whether the slope of the correlation, 0.7, remains the same all the way down to quiescence. This radio – X-ray correlation is among other things an important ingredient for the paper of Fender, Gallo, Jonker (2003).

XTE J1908+094

XTE J1908+094 is a rather faint BHC SXT. Below we show the X-ray and radio fluxes during the last part of the outburst as measured with *Chandra*, the VLA and the Westerbork Synthesis Radio Telescope. Note that the decay is steeper than the 0.7 slope which was found before. However, there are some caveats.

- The second VLA observation was a week earlier than the second *Chandra* observation. This could distort the picture, however, since the decay was slow in that part of the outburst the effect is not likely to be large.
- The WSRT observation was at 5 GHz whereas the VLA observations were at 8.5 GHz. If the radio spectrum is not flat this could influence the flux determinations. However, in the low-hard state the radio spectral index in other BHC SXTs is nearly flat (Fender 2001)

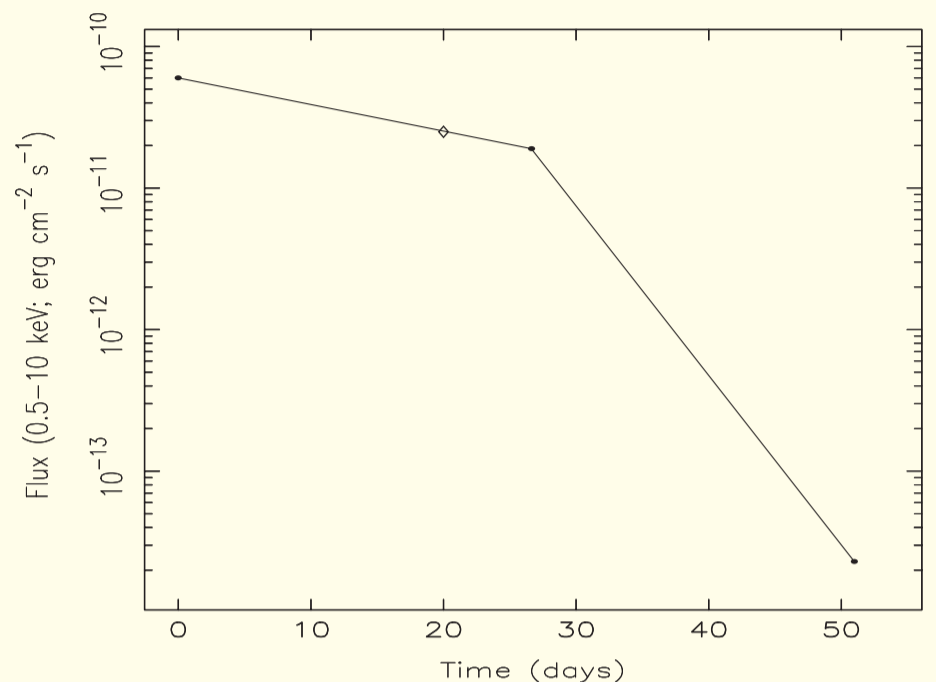


Fig. 2: Soft X-ray outburst decay measured with *Chandra*.

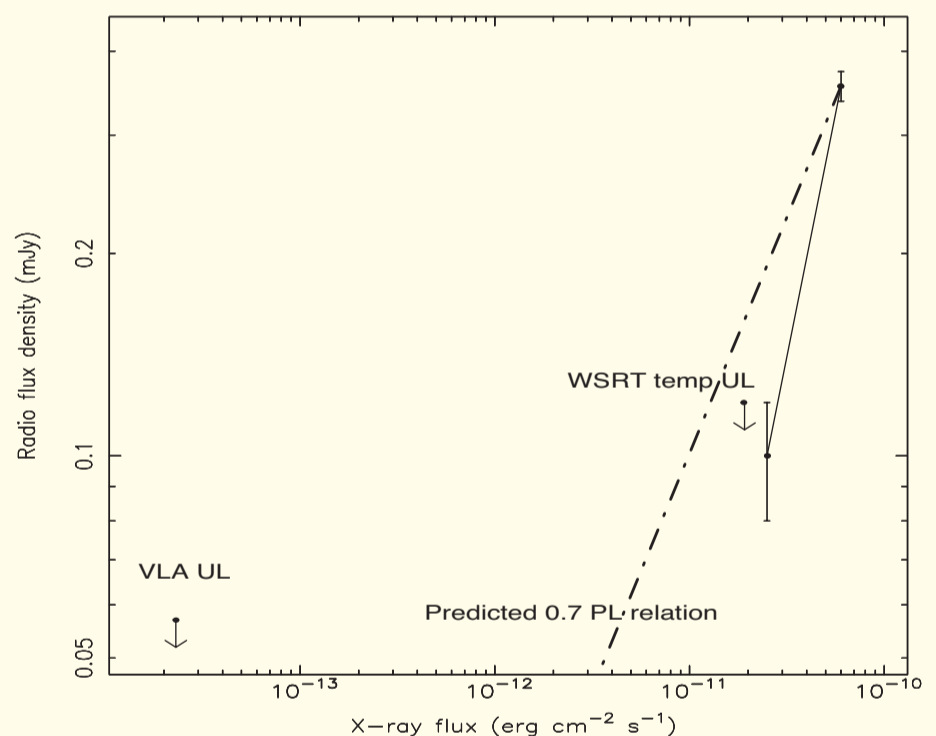


Fig. 3: The radio – X-ray correlation measured with the VLA (8.5 GHz) and the Westerbork Synthesis Radio Telescope (5 GHz).

This means?

The slope we measure 1.45 ± 0.30 (i.e. steeper than the 0.7 which was found in other sources) this could mean that

- the slope differs between sources
- the slope steepens below a certain luminosity (however, the distance to XTE J1908+094 is unknown).

However, given the uncertainties and caveats, obviously more observations are needed to constrain the slope at low accretion rates better.

References

- Corbel et al. 2003, A&A, 400, 1007
Fender, Gallo, Jonker 2003, MNRAS, 343, 99
Fender, 2001, MNRAS, 322, 31
Gallo et al. 2002, 4th MicroQ Workshop, astro-ph0207551
Gallo et al. 2003, MNRAS, 344, 60